Claims:

1. A bandwidth-enhanced laser imaging system comprising:

a plurality of lasing elements, each lasing element emitting a laser beam with a center wavelength λ_{0i} and a spectral bandwidth $\Delta\lambda_i$, wherein the center wavelength of at least one of the lasing elements is wavelength-shifted with respect to the center wavelength of at least one other lasing element, and

imaging optics that combines the respective laser beams,

wherein said combined laser beams have an ensemble spectrum Λ with an overlap parameter $\gamma = \overline{\Delta\lambda_i} / \overline{S_i}$, with $\overline{\Delta\lambda_i}$ being a mean spectral bandwidth of the lasing elements and $\overline{S_i}$ being a mean wavelength shift between the center wavelengths λ_{0i} of the at least one and the at least one other lasing elements, with $\overline{\Delta\lambda_i}$ and $\overline{S_i}$ of the array being selected so that $\gamma \geq 1$.

2. The system of claim 1, further comprising a modulator illuminated with the combined laser beams and receiving image control signals to form a projected laser image.

3. The system of claim 2, wherein the value of γ is selected so as to reduce speckle in the projected laser image.

4. The system of claim 1, wherein the lasing elements are semiconductor lasers that are arranged in a common emission plane.

5. The system of claim 1, wherein the lasing elements form a two-dimensional array.

6. The system of claim 1, wherein the ensemble spectrum Λ has an ensemble bandwidth $\Delta\Lambda$ between 1 nm and 10 nm.

7. The system of claim 1, wherein the lasing elements emit a primary color selected from the group consisting of R, G and B.

8. The system of claim 1, wherein the lasing elements emit optical radiation in the UV or IR spectral range, the system further comprising an optical frequency converter pumped by the lasing elements.

9. The system of claim 1, wherein the lasing elements are selected from the group consisting of semiconductor diode lasers, optically-pumped lasers and fiber lasers.

10. The system of claim 8, wherein the optical frequency converter comprises at least one element selected from the group consisting of OPO, SHG, SFG, periodically-poled and quasi-phase-matched nonlinear optical structures.

11. The system of claim 1, wherein the imaging optics comprises an integrating lens and a condenser lens, thereby providing substantially uniform illumination of the common image area.

12. The system of claim 11, wherein the integrating lens is a fly-eye lens.

13. An illuminator for laser projection imaging with reduced speckle, comprising:

a plurality of lasing elements, with each lasing element defining a laser beam with a center wavelength λ_{0i} and a spectral bandwidth $\Delta\lambda_i$, and

a beam homogenizer that images the laser beams of the plurality of lasing elements on a common imaging surface,

wherein the imaged laser beams define an ensemble spectrum Λ having a spectral overlap parameter $\gamma = \overline{\Delta\lambda_i} / \overline{S_i} \geq 1$, with $\overline{\Delta\lambda_i}$ being a mean spectral bandwidth of the lasing elements and $\overline{S_i}$ being a mean spectral separation between the center wavelengths λ_{0i}.

14. A bandwidth-enhanced RGB laser projection system with reduced speckle, comprising:

three illuminators associated with a respective R, G and B channel and producing R, G and B illumination,

a beam combiner for combining the R, G and B illumination, and

projection optics for projecting the combined R, G and B illumination on a projection display,

wherein at least one of the R, G, and B illuminators comprises a plurality of lasing elements, each lasing element emitting a laser beam with a center wavelength λ_{0i} and a spectral bandwidth $\Delta\lambda_i$, wherein the center wavelength of at least one of the lasing elements is wavelength-shifted with respect to the center wavelength of at

least one other lasing element, and

imaging optics that combines the respective laser beams to form the R, G or B illumination,

wherein said combined laser beams have an ensemble spectrum Λ with an overlap parameter $\gamma = \overline{\Delta\lambda_i} / \overline{S_i}$, with $\overline{\Delta\lambda_i}$ being a mean spectral bandwidth of the lasing elements and $\overline{S_i}$ being a mean wavelength shift between the center wavelengths λ_{0i} of the at least one and the at least one other lasing elements, with $\overline{\Delta\lambda_i}$ and $\overline{S_i}$ of the array being selected so that $\gamma \geq 1$.

15. The RGB laser projection system of claim 14, further comprising respective modulators, wherein each modulator is illuminated with one of the R, G and B illumination and responsive to image control signals corresponding to the respective R, G or B channel, said image control signals modulating the R, G or B illumination, and the projection optics projecting the modulated R, G and B illumination on the projection display to form a projected laser image with reduced speckle.

16. A laser illumination source for a bandwidth-enhanced laser imaging system, comprising:

laser means emitting laser radiation with a spectral bandwidth at a plurality of spaced-apart laser wavelengths, and

beam combining means for combining the laser radiation to illuminate a common area,

wherein the spectral bandwidth averaged over the laser means is greater than a difference between the spaced-apart wavelengths averaged over the laser means.

17. A method of producing bandwidth-enhanced laser radiation, comprising:

producing a plurality of laser beams, each laser beam having a center wavelength λ_{0i} and a spectral bandwidth $\Delta\lambda_i$, wherein the center wavelength of at least one of the laser beams is wavelength-shifted with respect to the center wavelength of at least one other laser beam, and

combining the respective laser beams into a spatially overlapping beam,

wherein the spatially overlapping beam has an ensemble spectrum Λ with an overlap parameter $\gamma = \overline{\Delta\lambda_i} / \overline{S_i}$, with $\overline{\Delta\lambda_i}$ being a mean spectral bandwidth of the laser beams and $\overline{S_i}$ being a mean wavelength shift between the center wavelengths λ_{0i} of the at least one and the at least one other laser beams, with $\overline{\Delta\lambda_i}$ and $\overline{S_i}$ of the array being selected so that $\gamma \geq 1$.